Protection of Co-Channel and Adjacent-Channel ITFS Stations (Plan B Scenario)

14. CTN originally proposed a 24 MHz guardband (now referred to as "Plan A" in these comments) to protect co- and adjacent-channel stations and other stations from BFO. With the criteria proposed above to mitigate BFO interference before it could become chronic, less guardband may be needed to protect co- and adjacent-channel stations.

15. Accordingly, an alternative would be reduce the Response Station guardband from 24 MHz to 6 MHz. This again would mean that no ITFS co-channel or ITFS adjacent-channel Response Station operations would occur thereby eliminating the need for complex new (and controversial) interference calculation algorithms and would again mean that the service would be self-regulating, as any co-channel or adjacent-channel interference that would be caused would be self-interference. Under the Plan B scenario, for example, both downstream and upstream Response Station MDS operations would be permitted on Channels E2–E4 and F1–F4 if there were an ITFS D-Group in the area (MDS Channel E1 would be precluded from upstream operations because of the requirement for a 6 MHz guardband to ITFS Channel D4). If there were an ITFS G–Group in the area, then MDS Channel F4 would also not be available for upstream Response Station use. However, if there were neither a nearby ITFS D-Group nor ITFS G-Group, then MDS Channels E1–E4, F1–F4, G1–G4, and H1–H3, could conceivably become available for Response Station upstream operations.

16. Under the more likely scenario applying to an ITFS/MDS market having sufficient population to make upstream Response Stations commercially attractive, where existing ITFS D and G groups would exist, then the available upstream Response Station spectrum would be up to 36 MHz at 2.5 GHz (MDS Channels E2, E3, E4, F1, F2 and F3) plus up to 12 MHz at 2.1 GHz, for a total of up to 48 MHz. Not quite as much spectrum as would be available in the Plan A scenario, but still substantial.

17. A further complication of the Plan B scenario would be the potential loss of bandpass or bandreject filtering as a BFO interference mitigation tool, in that a 6-MHz guardband is too narrow to allow the use of filters at 2.5 GHz. Although the approximately 24 MHz worth of guardband needed for practical filter applications might still be possible if, for example, only the ITFS A & B Groups were in local use, this favorable situation would be unlikely to occur in markets large enough to attract two-way, upstream, Response Station applicants. Thus, as a practical matter, the price paid for implementing the Plan B scenario would be elimination of a powerful BFO

mitigation tool. But, since filters would not be the only BFO mitigation tool, their preclusion might be an acceptable tradeoff to not having to partially refarm the ITFS band.

18. Thus, guardbands would be necessary under either scenario in order to solve the co-channel and adjacent-channel upstream Response Station-into-downstream ITFS receive sites interference problem, but the 24-MHz wide guardband Plan A scenario would have the advantage of allowing practical use of filters, while the 6-MHz wide guardbands proposed under the Plan B scenario would have the advantage of not requiring ITFS G-Group licensees to change channels.

Preclusive Effect of Omnidirectional Response Station Hubs

19. At Paragraph 14 of the NPRM, the concept of one or more "Response Station Hub" receive sites was introduced. Although the need for omnidirectional receiving antennas is understood and acknowledged if one presumes the need to receive upstream signals from a large number of Response Station transmitters, whose locations will not be known in advance, the proposal to grant such Response Station Hubs protected status would result in an unacceptable preclusionary effect on ITFS licensees. An obligation for ITFS licensees to have to protect one or more omnidirectional receive sites would constitute a *de facto* "freeze" on modifications to existing ITFS stations or the introduction of new ITFS stations. If, however, either of the two alternative upstream spectrum scenarios proposed in the preceding paragraphs were adopted, then the preclusionary effect of Response Station Hubs would again be born by the party seeking the benefit of such new two-way operations: namely, the wireless cable operator.

20. A further complication in requiring ITFS licensees to protect Response Station Hubs would be the method used to calculate the D/U ratio, when the Desired Response Station signal strength is a "moving target." Unlike conventional ITFS and MDS stations, where the location and other technical characteristics of the protected ("Desired") station are known, the Desired signal level from a Response Station transmitter would depend upon its type and, more importantly, its location. Since the location, or, for that matter, even the bandwidth, would not be known in advance, ITFS licensees could not even be assured that showing the interfering signal to be below thermal noise‡ for a conventional NTSC signal would be sufficient to demonstrate that no interference would occur. Thus, virtually all subsequent modifications to existing ITFS stations, and many new ITFS stations, would be unable to demonstrate either a 45 dB or better D/U ratio for co-channel Response Station Hubs, or 0 dB or better D/U ratio for adjacent-channel Response Station Hubs, and would have to obtain "no objection" letters from the Response Station Hub

‡ For the 4-MHz video bandwidth of a conventional NTSC analog signal, thermal noise is generally accepted to be -59.1 dBmV, or -107.9 dBm, at room temperatures.

licensee, before any modifications to an existing ITFS station in the same, and even adjacent markets, could be made.

21. The Commission may choose to adhere to the policy it established in its October 27, 1995, Memorandum and Order on Reconsideration to MM Docket 94-131, which, at Page 14, Paragraph 31, stated

> The protection standard does not specify a minimum value of desired signal strength; i.e., to protect only those portions of the 56.33-km (35-mile) area where there are wireless cable subscribers or which is otherwise being served. An incumbent may wish to serve a portion of the protected area shielded from the incumbent's transmitter site with a signal booster. Nevertheless, the applicable 45 dB or 0 dB desired-to-undesired signal strength ratios must be satisfied throughout the protected area.

Thus, under the Commission's current policy for ITFS interference studies, it is not acceptable to show that a proponent's Undesired, or "interfering" signal, would below thermal noise for the Desired signal's bandwidth; rather, an ITFS proponent would have to show that its proposed modification or newcomer ITFS station would be 45 dB or 0 dB (as appropriate) below the weakest level signal that the Response Station Hub licensee's receivers could conceivably detect. For a Response Station transmitter having a bandwidth of, say, 100 kHz, this would be $10\log_{10}$ (0.1 MHz/4 MHz), or 16 dB below the nominal -108 dBm thermal noise floor for conventional NTSC analog signals, or -124 dBm. Very few adjacent-channel ITFS applications within 50 miles of an omnidirectional Response Station Hub receiving antenna would be able to demonstrate a received carrier level this low (*i.e.*, a 0 dB D/U ratio), and certainly no co-channel ITFS stations within 50 miles, or within 100 miles and having line of sight to a Response Station Hub, would be able to demonstrate a received carrier level of -169 dBm (*i.e.*, a 45 dB D/U ratio). Thus, to require ITFS stations to protect omnidirectional Response Station Hubs for subsequent ITFS modifications would either result in a *de facto* freeze to the ITFS service, or would give Response Station Hub licensees such powerful leverage as a result of the need for "no objection" letters from those licensees that any semblance of a "level playing field" would be lost.

Relaxed Spectral Mask for Response Station Transmitters Should Not Be Allowed

22. Beginning at Paragraph 19, the NPRM discusses relaxed out-of-band spurious emission requirements for Response Station transmitters. We oppose any such relaxation because of the obvious interference potential this would cause to non-co-channel, non-adjacent channel ITFS receive sites. For example, at Paragraph 22 of the NPRM a proposal to allow Response Station transmitters to generate discrete spurious emissions above the upper and below the lower channels edges if (1) each spurious signal is attenuated below the average power of the in-band

emission by 40 dB, (2) no more than a single spur occurs in each 10 MHz of spectrum within 50 MHz of the edges; and (3) no spurious signals occur beyond 50 MHz from the channel edges.

23. Even under the Plan A spectrum option proposed in these comments the relaxed Response Station transmitter spurious signal limits represent an interference threat. For example, since the ITFS-downstream to MDS-upstream guardband would be only 24 MHz wide, it follows that a Response Station transmitter could have a spurious signal falling on a frequency that would be seen as an in-band, co-channel interfering signal by an ITFS receiver. Even assuming the reduced Response Station EIRP of +48 dBm proposed in the NPRM, this still results in a spurious signal with an EIRP of +8 dBm. Since this could look like a co-channel interfering signal, a D/U ratio of 45 dB would apply. The interference potential of Response Station transmitters generating up to ten discrete spurious signals at up to +8 dBm EIRP each, of which at least two could be seen as in-band, co-channel interfering signals under the Plan A proposal suggested in these comments, or of which up to all ten could be seen as could be seen as in-band, co-channel interfering signals under the alternative 6-MHz guardband Plan B CTN proposal, are both unacceptable. And were the Commission to ultimately allow Response Station transmitters to have EIRPs of up to +63 dBm (2,000 Watts), then the allowable discrete-frequency spurious signal power level would increase to +23 dBm: this would then exceed the +21 dBm EIRP limit allowed by Section 74.985(g) of the existing ITFS Rules for Signal Booster Stations, but without the reasonable and necessary safeguards that the Rules require for Signal Booster Stations (*e.g.*, no co-channel or adjacent-channel ITFS receive sites within 1.61 kilometers, and prior notification to ITFS licensees within eight kilometers of the Signal Booster Station.)

24. It could be asserted that Response Station transmitters would be "unlikely" to have a discrete frequency spurious signal at only -40 dBc in each 10-MHz segment above and below the intended Response Station channel were made. However, it is our belief that marketplace pressures would cause the manufacturers of Response Station transmitters to take all cost-cutting steps possible, and that there was probably a very good reason why the WCA Petition proposed such relaxed out-of-channel spurious signal limits. Prudence demands that ITFS licensees, and the Commission, assume that if new Rules allow a relaxed spurious signal specification, the manufacturers of mass produced Response Station transmitters will either just meet the specification, or will soon relax a better specification so as to just meet what the Rules allow, especially if the consequences of such discrete frequency spurious signals affect some third party, and not the operator's own customers.

25. It is therefore suggested that a more reasonable out-of-band spurious signal limit for Response Station transmitters would be at least -48 dBc for signals within ±6 MHz of the

Response Station band edges, and at least -60 dBc for signals greater than ±6 MHz of the Response Station band edges. Further, in the event the Commission ultimately allows Response Station EIRPs of greater than +48 dBm (but in no event greater than +63 dBm), then it is respectfully suggested that an increased out-of-channel specification be adopted dB for dB. For example, if ultimately a 500-watt (+57 dBm) Response Station EIRP is adopted, the more than 6 MHz out-of-band specification would be correspondingly increased from -60 dBc to -69 dBc; if a 1,000-watt (+60 dBm) EIRP limit were to be adopted, the more than 6 MHz out-of-band specification would increase to -72 dBc, and so on

Summary

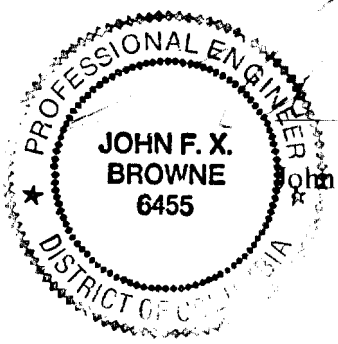
26. The introduction of upstream, or two-way, capability poses many opportunities for enhanced MDS services, of which ITFS licensees could also benefit by entering into expanded lease agreements that would allow ITFS operators options such as Internet access without having to use the public switched telephone network. However, these new rules should be structured so as to be self-regulating, in that the results of improperly performed interference studies, or properly performed interference studies based on what may be invalid assumptions, should result in interference to the newcomer service, and not to existing users. By limiting upstream Response Station transmissions to the 2.1 GHz MDS band, and to a still generous 36 to 42-MHz portion of the 2.5 GHz ITFS/MDS band, the Commission avoids completely the burden of arbitrator between existing ITFS licensees and newcomer MDS Response Station proponents. MDS Response Station operators would still get up to 54 MHz of spectrum for two-way, "upstream" transmissions, but the risk of self-interference would be properly placed on the newcomer, and benefiting, party.

Catholic Television Network

List of Figures

27. The following figures have been jointly prepared as part of these MM Docket 97-217 comments:

1. Figure showing proposed "notification" zone around an ITFS receive site.
2. Figure showing a proposed partially re-farmed ITFS spectrum.



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Dane E. Ericksen, P.E.
Hammett & Edison, Inc.
Consulting Engineers

January 6, 1998

List of Figures

27. The following figures have been jointly prepared as a part of these MM Docket 97-217 comments:

1. Figure showing proposed "notification" and "equipment test" zones around an ITFS receive site.
2. Figure showing the "Plan A" ITFS/Response Station spectrum.

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John F.X. Browne and Associates, PC
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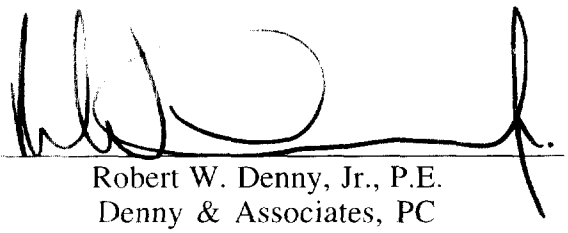

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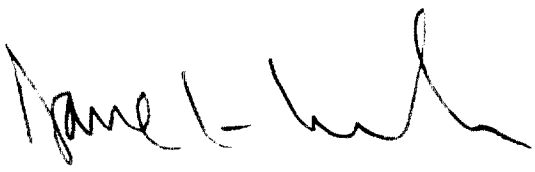

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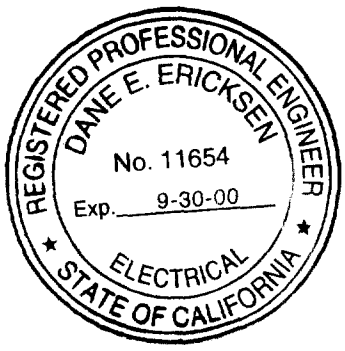


DENNY & ASSOCIATES, P.C.
CONSULTING ENGINEERS
WASHINGTON, DC

JOINT ENGINEERING EXHIBIT
IN SUPPORT OF COMMENTS TO
MM DOCKET NO. 97-217
CATHOLIC TELEVISION NETWORK

Affidavit

WASHINGTON)
) ss:
DISTRICT OF COLUMBIA)

Robert W. Denny, Jr., being first duly sworn, says that he is president and treasurer of the firm of Denny & Associates, P.C., consulting engineers with offices in Washington, DC; that he is a professional engineer registered in the District of Columbia, the State of Maryland, and other jurisdictions; that his qualifications as an expert in radio engineering are a matter of record with the Federal Communications Commission; that the foregoing exhibit was prepared by him and under his direction; and that the statements contained therein are true of his own personal knowledge except those stated to be on information and belief and, as to those statements, he verily believes them to be true and correct.

Robert W. Denny, Jr., P.E.

Subscribed and sworn to before me this 7th day of January, 1998.

Jennifer J. Mateik
Notary Public, District of Columbia
My commission expires 2001

Affidavit

State of California | ss:
County of Sonoma |

Dane E. Ericksen, being first duly sworn upon oath, deposes and says:

1. That he is a qualified Registered Professional Engineer, holds California Registration No. E-11654, which expires on September 30, 2000, and is employed by the firm of Hammett & Edison, Inc., Consulting Engineers, with offices located near the city of San Francisco, California,

2. That he graduated from California State University, Chico, in 1970, with a Bachelor of Science Degree in Electrical Engineering, was an employee of the Field Operations Bureau of the Federal Communications Commission from 1970 to 1982, with specialization in the areas of FM and television broadcast stations and cable television systems, and has been associated with the firm of Hammett & Edison, Inc., since October 1982,

3. That the firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of the Catholic Television Network ("CTN"), representing numerous Instructional Television Fixed Service stations licensed to, and operated by, the Roman Catholic Archdioceses and Dioceses throughout the United States, in support of CTN comments to MM Docket 97-217 concerning two-way, "cellularized" ITFS and Multipoint Distribution Service stations,

4. That such engineering work has been carried out by him or under his direction and that the results thereof are attached hereto and form a part of this affidavit, and

5. That the foregoing statement and the report regarding the aforementioned engineering work are true and correct of his own knowledge except such statements made therein on information and belief and, as to such statements, he believes them to be true.

Dane E. Ericksen, P.E.

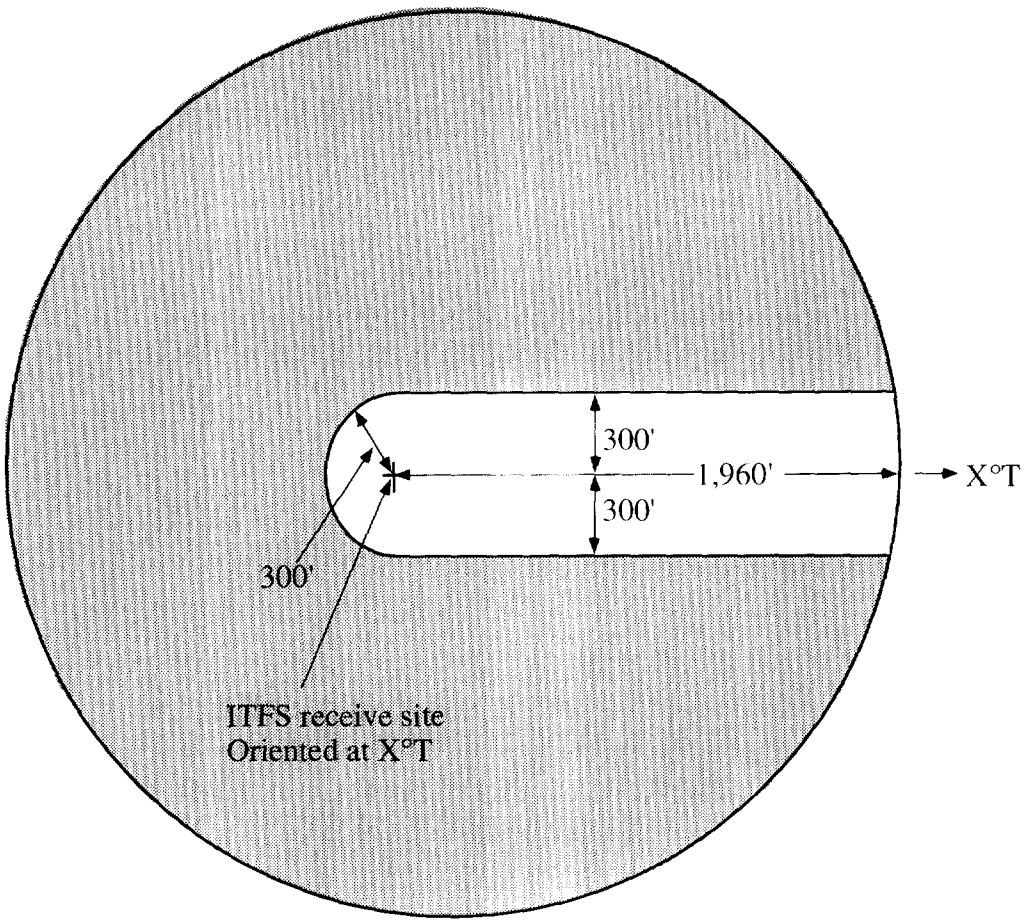
Subscribed and sworn to before me this 7th day of January, 1998

CRS 2 JERI L. THOMSEN ... #1028103 ... PUBLIC - CALIFORNIA ... SONOMA COUNTY ... My Comm. Expires May 29, 1998 CRS 2

Jeri L. Thomsen

Catholic Television Network

Proposed Notification and Equipment Test Zones

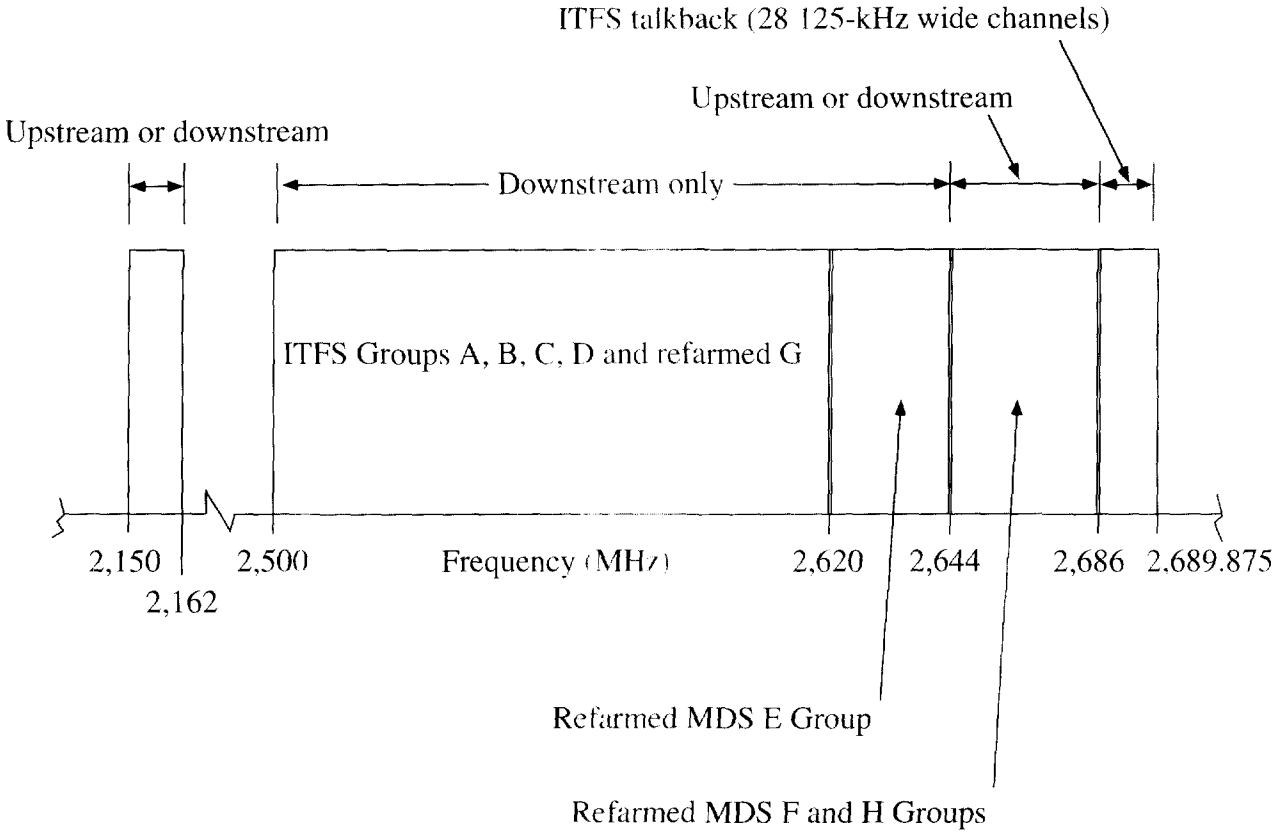


Not to Scale.

Notification zone
Notification and Equipment Test zone

Catholic Television Network

"Plan A" ITFS/Response Station Spectrum



CERTIFICATE OF SERVICE

I, William D. Wallace, hereby certify that I have on this 8th day of January, 1998, caused to be served true and correct copies of the foregoing "Comments" upon the following parties via hand delivery (indicated by an *) or first-class United States mail, postage prepaid:

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Washington, D.C. 20554

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